Fluctuation rheology using a polymer(Poster session 1, New Frontiers in Colloidal Physics : A Bridge between Micro- and Macroscopic Concepts in Soft Matter)

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In this poster we dicuss the theoretical idea of using the shape fluctuation of a probe polymer to measure the long wavelength rheology property of its environment. The dynamic fluctuation of the shape of a semi-flexible polymer in a non-local linear viscoelastic medium is calculated. The advantages and restrictions of using a polymer as a probe to perform fluctuation rheology are considered. The polymer has an intrinsic elastic response, which acts as the reference for the measured viscoelasticity of its surrounding medium. Since the elstic restoring force depends on the wavelength of the fluctuations, shape fluctuation data from different wavelengths contain independent pieces of information. The viscoelasticity can be extracted from the data on the numerous internal degrees of freedom of the probe polymer, without using the analytical continuation method in the data analysis. The tension applied to the polymer also acts as an additional controlled variable in the experiment.

References

[1] W. Y. Woon and C.-Y. D. Lu, Europhys. Lett. **65** (2004), 420.

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